

REMARKS/ARGUMENTS

Claims 4, 30, 31 and 34-37 are pending in this application. By this Reply, claims 4, 30 and 31 have been amended to correct minor typographical errors and new claims 36 and 37 have been added. Support for the new claims 36 and 37 can be found in the specification. Applicants respectfully request reconsideration of the application in response to the Office Action.

Claim Rejections – 35 U.S.C. § 103(a)

Claim 4 has been rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Haruki et al. (US 2001/0003410 A1 to Haruki et al. (Haruki) in view of US 6,454,967 B1 to Im et al. (Im). Claim 30-31 and 34-35 has been rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Haruki et al. in view of US 6,380, 669 to Zachau et al. (Zachau) and further view of Im. These rejections are respectfully traversed for the main reason that the Examiner has either not established a *prima facie* case of obviousness since the reasoning for modifying Haruki is lacking or has failed to consider the evidence in the specification when assessing patentability, and when failing to do so with respect to the latter, any allegation of obviousness is effectively rebutted by the showing in the specification.

In rejecting claim 4, the Examiner correctly notes that Haruki is silent as to the mixture ratio range (1 ~ 25 wt%) of the third phosphor material. In order to overcome the deficiency in failing to teach the range of 1 ~ 25 wt% in Haruki, the Examiner cites the second reference as follows:

Im teaches the weight of the third class phosphor material to total weight is 1:3 ratio in order to provide a device with improved color temperature

and brightness... one of ordinary skill at the time could apply his teachings to modify the device [of] Haruki wherein the weight of the third class phosphor material to total weight is 1 ~ 25 wt% ratio in order to provide a device with improved color temperature and brightness as taught by Im et al.

Moreover, the applicant has not established the critical nature of 1 ~ 25% ... the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range.

Applicants traverse the rejection on two grounds. First, the disclosure of Im does not provide the motivation to modify Haruki so as to arrive at the invention. Second, Applicants have shown that control of the amount of the third class phosphor produces unexpected benefits that are not taught by the cited prior art and these benefits serve as a rebuttal to the allegation of obviousness.

In the rejection, the Examiner cites Comparative Example 2 of Im as teaching a ratio of 1:3 for BAM:ZSM. This means that BAM is 33% of the total weight. The teachings of Im relates to the addition of boron for the purpose of improving the luminance characteristics. This is clear when viewing Table 1, wherein Comparative Example 1 is ZSM, Comparative Example 2 is BAM:ZSM with a ratio of 1:3, and Comparative Example 3 is BAM:ZSM with a ratio of 1:1. The purpose of Comparative Examples 1-3 is to show that even if the base of ZSM is modified with the presence of BAM, the results are still inferior to that of Examples 1-8, all of which correspond to BAM modified with B.

One flaw in the reasoning of the rejection is that the Examiner concludes that the ratio of ZSM to BAM is adjusted in Im for the purpose of “to provide a device with improved color

temperature and brightness”. This statement is a distortion of the teachings of Im. While it is true that Im teaches improvements in terms of color temperature and brightness, these improvements are attributed to the control of the formula relating to the boron-containing BAM, not the ratio of BAM to ZSM as found in Comparative Example 2.

All Im does is to suggest two mixture ratios of $\text{BaAl}_{12}\text{O}_{19}:\text{Mn}$ and $\text{Zn}_2\text{SiO}_4:\text{Mn}$ for the purpose of making a comparison to the invention. There is no guidance whatsoever regarding the importance of such a ratio or any beneficial effect thereof. This means that the mere fact that Im teaches a ratio in the context of a comparison with the Im invention is not a legitimate basis to conclude that one of skill in the art would alter the ratio of the third class phosphor in Haruki and arrive at the claimed ratio. There is nothing that leads one of skill in the art to make such a modification. Again, Im does not link the improvements taught therein to control of the ratio. The ratio is changed only for comparison purposes to the Im invention, not to improve one or more properties. What this means is that the Examiner has committed error in making the rejection of claim 4 based on Haruki and Im. This error is in the form of modifying Haruki in a way to arrive at the invention when no legitimate reason exists for doing so. The mere identification of a ratio in the prior art alone is not enough to support the conclusion. The Examiner must have some articulated reasoning to modify Haruki and the comparative examples in Im are insufficient to do so. Therefore, a *prima facie* case of obviousness is not established against claim 4 based on Haruki and Im and the rejection should be withdrawn.

Put another way, when one of skill in the art is reading Im, what reason would they have for producing the claimed ratio of the third class phosphor of the green phosphor in Haruki. Im does not teach that the control of the ratio has any benefit so why do it. The Examiner is engaging in the hindsight reconstruction of the prior art to arrive at the invention and such an approach cannot produce a sustainable rejection.

The secondary reference to Zachau does not make up for the failings in Im. Thus, even if this reference were combined with Haruki, the invention would still not be taught.

The other independent claims include the 1-25% feature found in claim 4 and this means that they are also patentable over the prior art.

Applicants also contend that the control of the content of the third class phosphor as claimed produces advantages that are not expected and these advantages are a rebuttal of any contention of obviousness. While the Examiner seems to assert that the range of the weight of the third phosphor in relation to the total weight is a limitation that is not important or linked to improvements meriting patent protection, the Examiner's attention is directed the Tables of the instant specification. The data contained therein shows that extensive studies have been performed to determine the effects of mixture ratios of various phosphor materials on the aging rate and the driving voltage as well as optical characteristics. See also page 9, lines 18-23 of the specification. Based on the studies contained in the specification, the mixture ratio range of 1 ~ 25 wt% was selected to optimize the aging rate and the driving voltage as well as optical characteristics. In marked contrast, Im merely suggests a mixture ratio of BaAl₁₂O₁₉:Mn and

Zn₂SiO₄:Mn without providing any meaningful guidance on how to arrive at the selected mixture ratio. Furthermore, the Im patent is directed to adjusting mixture ratios to optimize the relative luminance and color coordinate characteristics. As such, the Im patent does not recognize the effect of the mixture ratio on the driving voltage and aging rate, i.e., Im fails to recognize the mixture ratio as a result-effective variable in optimizing the driving voltage and aging rate. Stated differently, the mixture ratio range of 1 ~ 25 wt% of the presently claimed invention is critical since the mixture ratio range provides an unexpected result in the driving voltage and the aging rate. In *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990), the board held that a *prima facie* case of obviousness can be overcome by showing the criticality of the claimed range.

In addition, to further distinguish claim 4 from the systems of the cited references, claim 4 has been amended to recite “greater than or equal to 1 wt% and less than 25 wt%.” In light of the change to claim 4 and under the legal standard articulated in the *In re Woodruff* case, Applicants respectfully submit that any *prima facie* case of obviousness has been rebutted and that claim 4 is allowable. Claim 30 has been amended to include the similar claim language as that cited above with respect to claim 4. As such, Applicants respectfully submit that claim 30 and its dependent claims 31, 34, and 35 are also allowable for at least the same reasons.

New claims 36 and 37 also parallel claim 4 with respect to the third class phosphor ratio and these claims are patentable for the same reasons as claim 4.

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CONCLUSION

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. Favorable consideration and prompt allowance are earnestly solicited.

If the Examiner believes that any additional changes would place the application in better condition for allowance, the Examiner is invited to contact the undersigned attorney, **Daniel Y.J. Kim**, at the telephone number listed below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. §1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
KED & ASSOCIATES, LLP

Daniel Y.J. Kim
Registration No. 36,186

Correspondence Address:
P.O. Box 221200
Chantilly, VA 20153-1200
703 766-3777 DYK/CWB:dak

Date: December 3, 2009

Please direct all correspondence to Customer Number 34610

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